

November 6, 2008

U.S. Environmental Protection Agency  
Ground Water Office (WTR-9)  
75 Hawthorne Street  
San Francisco, CA 94105

ATTN: Nancy Rumrill

RE: Comments on Lahaina, HI WWRF UIC Permit Number HI50710003

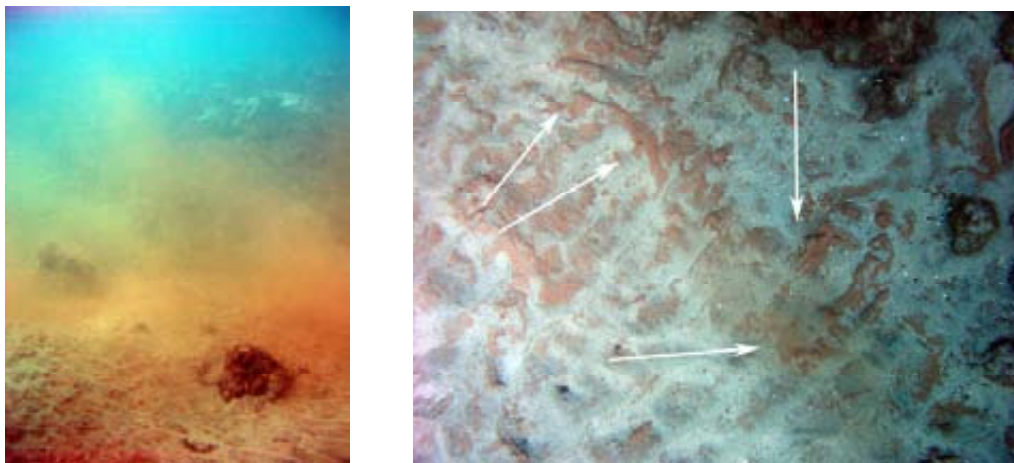
Dear Ms Rumrill:

I am providing comments herein regarding the referenced Underground Injection Control (UIC) Permit that U.S. Environmental Protection Agency (EPA) has proposed issuing to the applicant, County of Maui for the Lahaina Wastewater Reclamation Facility (WWRF). My overall comment is that neither the EPA nor the County of Maui have provided sufficient information to the public to demonstrate that the permit as written is protective of the environment and in compliance with applicable state and federal laws and regulations including the Safe Drinking Water Act, Coastal Zone Management Act, Clean Water Act, Hawaii State Constitution and Hawaii Revised Statutes.

**Comment 1 – Groundwater and coastal ocean waters are hydrologically connected.**

Groundwater in the coastal areas of West Maui is connected to the ocean waters via submarine groundwater discharges. This type of hydrologic connection is common in Hawaii, and has been well documented in the area of the Lahaina injection wells.

**Figure 1** – Submarine groundwater discharge near Honokowai November 2006 (8-10 meters depth) photos provided by Mark Vermeij, University of Hawaii



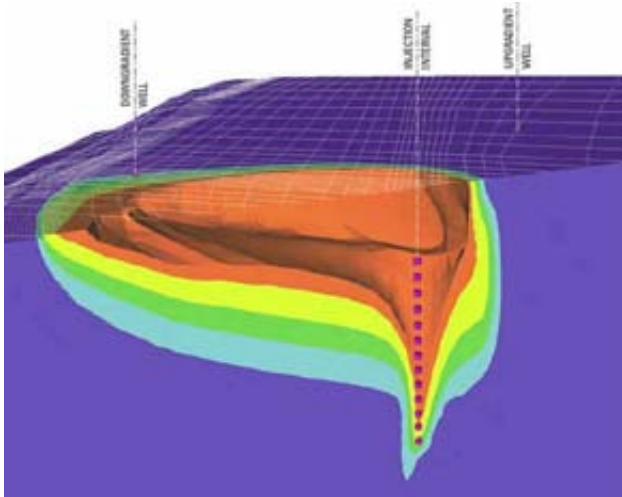
A 2007 study of submarine groundwater discharges in the Honokowai area of West Maui found that, “Tracer abundances were elevated in the unconfined coastal aquifer and the nearshore zone, decreasing to low levels offshore, indicative of groundwater discharge (near-fresh, brackish, or saline) at all locations” and “Groundwater nutrient fluxes of  $0.04\text{--}40\text{ mmol N m}^{-2}\text{ d}^{-1}$  and  $0.01\text{--}1.6\text{ mmol P m}^{-2}\text{ d}^{-1}$  represent a major source of new nutrients to coastal ecosystems along these coasts. Nutrient additions were typically greatest at locations with a substantial meteoric component in groundwater, but the recirculation of seawater through the aquifer may provide a means of transferring terrestrially-derived nutrients to the coastal zone at several sites.” “Submarine Groundwater Discharge and Nutrient Addition to the Coastal Zone and Coral Reefs of Leeward Hawaii” *Marine Chemistry, Volume 109, Issues 3-4, 16 April 2008, Pages 355-376* Joseph H. Street, Karen L. Knee, Eric E. Grossman and Adina Paytan.

The water that is currently subterranean is both connected to surface water and may have been surface water in the past or may discharge to surface water in the future. The Starwood Lot # 3 project proposes using ocean water as a source of cooling water. They plan to withdraw the ocean water via the groundwater connection by placing a well in the coastal zone at 300 feet depth.

**Comment 2 - Material from injection wells can be transported to coastal waters via the hydrologic connection of groundwater to ocean.**

This hydrologic connection of groundwater to ocean waters allows the transport of waste materials injected into the groundwater to sensitive coastal ecosystems including coral reef ecosystems. A modeling study of an injection well disposal system operated by the applicant in Kihei, HI found that “Wastewater injected beneath the brackish ground-water lens rises buoyantly and spreads out at the top of the lens, diverting and mixing with ambient ground water.” “Ground water discharging from the core of the injection plume is less than 5 years old and is about 60 percent effluent at the shore, according to the model.” The nutrient fluxes for nitrogen and phosphorus were 3.5 and 3.4 times higher than background. Stable isotope signatures and chemical constituents such as pharmaceuticals and organic wastewater were detected in the monitoring well down gradient of the injection well. “Ground-Water Nutrient Flux to Coastal Waters and Numerical Simulation of Wastewater Injection at Kihei, Maui, Hawaii” Charles D. Hunt, Jr. U.S. Geological Survey Scientific Investigations Report 2006-5283 version 1.0 (2007). <http://pubs.usgs.gov/sir/2006/5283>

**Figure 2** Cutaway block diagram of simulated wastewater injection plume at Kihei, HI. Colored bands represent gradation in effluent concentration. (From Hunt, 2007)



**Comment 3 – Both the ocean water and groundwater are “Waters of the U.S.” and “State Waters”**

According to the Code of Federal Regulations (CFR) at 40 CFR Part 122.2, *Waters of the United States or waters of the U.S.* means:

(a) **All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide** (emphasis added);

(b) All interstate waters, including interstate “wetlands;”

(c) **All other waters** such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, “wetlands,” sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds **the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters** (emphasis added):

(1) **Which are or could be used by interstate or foreign travelers for recreational or other purposes** (emphasis added);

(2) **From which fish or shellfish are or could be taken and sold in interstate or foreign commerce** (emphasis added); or

**(3) Which are used or could be used for industrial purposes by industries in interstate commerce** (emphasis added);

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) **Tributaries of waters identified in paragraphs (a) through (d) of this definition** (emphasis added);

(f) The territorial sea; and (g) “Wetlands” adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

"State waters", as defined by section 342D-1, Hawaiian Revised Statute (HRS), means “all waters, fresh, brackish, or salt around and within the State, including, but not limited to, **coastal waters**, streams, rivers, drainage ditches, ponds, reservoirs, canals, **ground waters**, and lakes; provided that drainage ditches, ponds, and reservoirs required as part of a water pollution control system are excluded.” (emphasis added).

"Coastal waters," means "all waters surrounding the islands of the State from the coast of any island to a point three miles seaward from the coast, and, in the case of streams, rivers, and drainage ditches, to a point three miles seaward from their point of discharge into the sea and includes those brackish waters, fresh waters and salt waters that are subject to the ebb and flow of the tide" (section 342D-1, HRS).

The groundwater into which the waste is injected is a mixture of ocean water and freshwater. The groundwaters in the coastal areas of West Maui are hydrologically connected to coastal ocean waters. The water that is currently subterranean may have been on the surface in the past and used for interstate commerce. The groundwater fluctuates with tidal influence (subject to the ebb and flow of the tides) as well as freshwater input. The coastal groundwater is tributary to the coastal ocean waters. The groundwater, by virtue of its hydrologic connection to the ocean, and ability to transport waste materials to the ocean waters, is clearly a water that the “use, degradation, or destruction of which would affect or could affect interstate or foreign commerce” including recreational use by foreign or interstate travelers. Coastal groundwater and coastal ocean waters are considered to be both Waters of the US and state waters.

The US Supreme Court recently reviewed Clean Water Act jurisdictional issues pertaining to the definition of Waters of the US (SUPREME COURT OF THE UNITED STATES *RAPANOS et ux., et al. v. UNITED STATES*). According to information provided by Cornell University Law School (<http://www.law.cornell.edu/supct/html/04-1034.ZS.html>), “Justice Kennedy concluded that the Sixth Circuit correctly recognized that a water or wetland constitutes “navigable waters” under the Act if it possesses a “significant nexus” to waters that are navigable in fact or that could reasonably be so made. The nexus required must be assessed in terms of the Act’s goals and purposes. Congress enacted the law to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters,” 33 U. S. C. §1251(a)”. According to the Pacific Legal Foundation (<http://rapanos.typepad.com/>)

“First, *Rapinos* says *nothing* about navigability---the test for whether a waterbody qualifies as a traditional navigable waterway (for Commerce Clause purposes, and thus for Clean Water Act purposes) has remained essentially unchanged for more than half a century. See *United States Appalachian Elec. Power Co.*, 311 U.S. 377 (1940). What *Rapinos* changed was the test for determining whether a *nonnavigable waterbody* is sufficiently connected to a navigable waterway to allow for regulation of the former.

Second, whether or not part of a waterbody is considered navigable has no direct effect on whether the nonnavigable portions of the waterbody are covered under the CWA.”  
“Under the *Rapinos* Kennedy test, if the waterbody substantially affects the physical, chemical, and biological integrity of the navigable waterbody, then it's jurisdictional.”

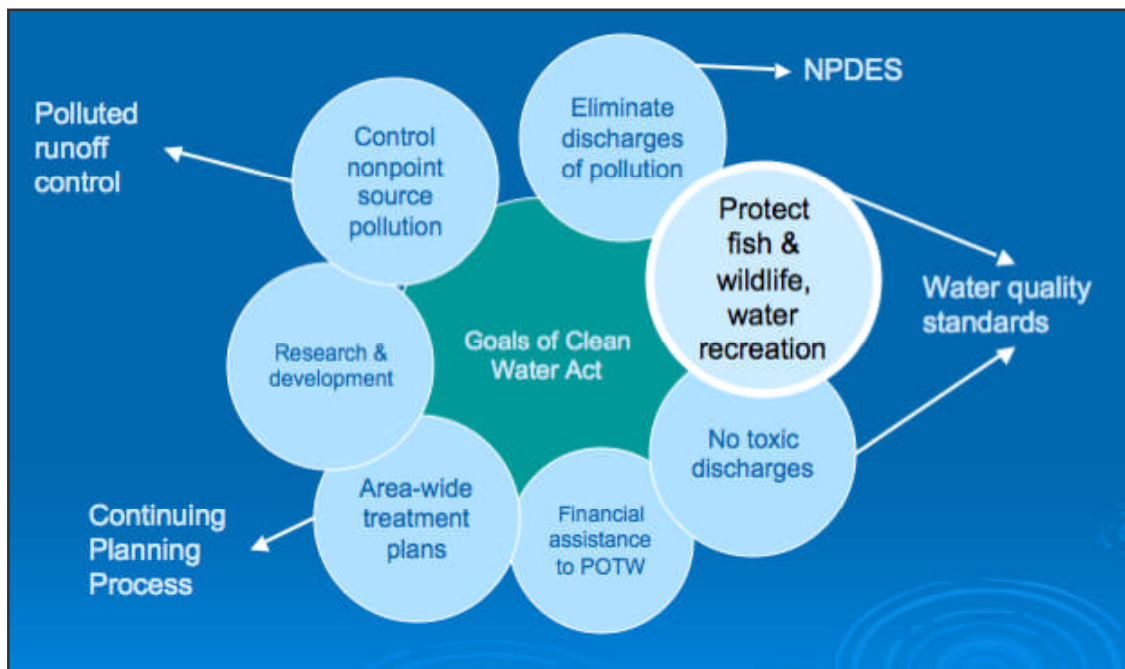
Thus it can be seen that the groundwater into which the Lahaina WWRF are injected are “Waters of the US”

#### **Comment 4. Clean Water Act requirements applicable to Waters of the US**

The Clean Water Act (CWA) or Federal Water Pollution Control Amendments of 1972 (codified at 33 U.S.C. § 1251) is the primary federal law regulating water quality of Waters of the US. EPA is the federal agency tasked with administering the Clean Water Act. EPA delegates to states the authority and/or responsibility for implementing certain aspects of the CWA programs. In Hawaii, the state Department Of Health (DOH) is responsible for water quality management programs (including planning, monitoring and reporting), the National Pollutant Discharge Elimination System permits and control of nonpoint source [pollution]. The following discussion of Clean Water Act requirements is taken from information presented to the Hawaii Department Of Health (DOH) Integrated Water Quality Reporting workgroup during the Summer of 2008.

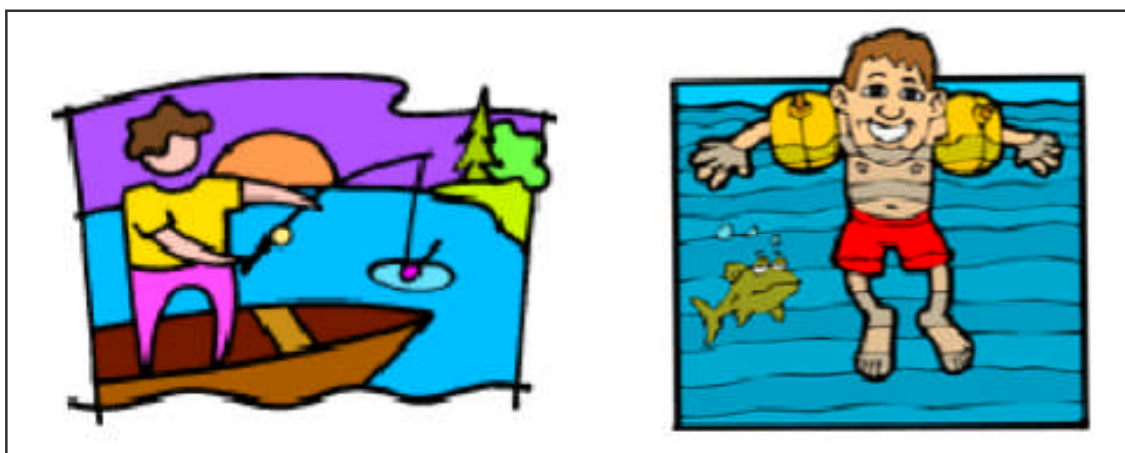
The objective of the Clean Water Act (CWA) is to “restore and maintain the physical, chemical, and biological integrity of the Nation’s waters.” The CWA establishes as a national goal “water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable.” To achieve these objectives and goals, EPA requires states to adopt water quality standards (WQS) including designated uses, narrative and numeric criteria to protect those uses, and antidegradation policies to prevent deterioration of high-quality waters. The CWA requires WQS to protect the public health and welfare and enhance the quality of water. The State of Hawaii has adopted such standards at Hawaii Administrative Rule (HAR) Chapter 11-54.

**Figure 3.** Goals of Clean Water Act



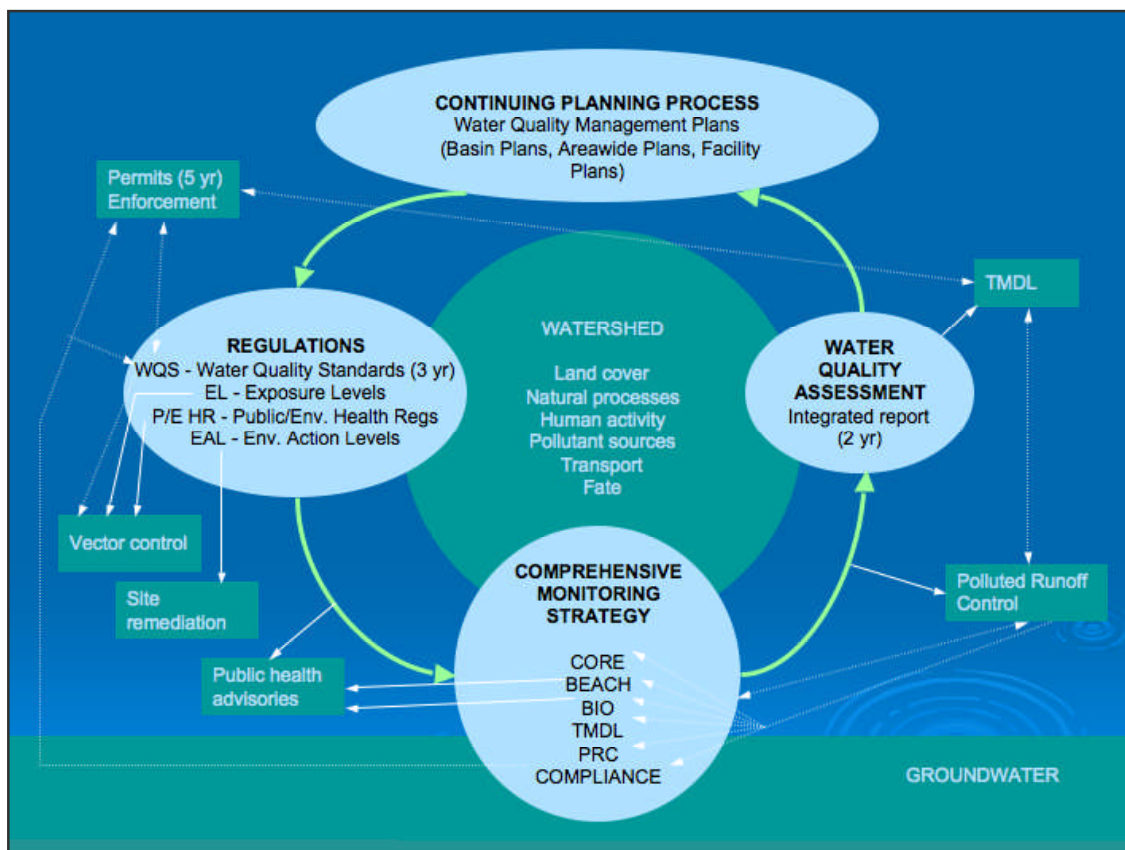
EPA's regulations require that State WQS provide at a minimum for the "fishable/swimmable" uses unless those beneficial uses have been shown to be unattainable. In designating waters, states consider the beneficial use and value of water for public water supplies; protection and propagation of fish, shellfish and wildlife; recreation in and on the water; consumption of fish and shellfish by humans; and agricultural, industrial, and other purposes including navigation. In no case may waste transport or assimilation be adopted as a designated beneficial use for any waters of the United States.

**Figure 4. Clean Water Act Goals: Fishable / Swimmable**



States implement monitoring programs that allow them to report on attainment of WQS and to identify and prioritize waters not attaining standards. In even numbered years states are required to submit to EPA a water quality inventory report (305(b) report) that includes a description of the water quality of all waters of the state (including, rivers/stream, lakes, estuaries/oceans and wetlands). States may also a description of the nature and extent of ground water pollution and recommendations of state plans or programs needed to maintain or improve ground water quality. Figure 5 illustrates the relationship of the water quality planning, assessment, monitoring, and regulatory programs implemented under authority of the CWA by the DOH.

**Figure 5. Continuing Planning Process**



States are also required to report in even numbered years a list of impaired and threatened waters requiring Total Maximum Daily Loads (TMDLs) (303(d) List); identification of the impairing pollutant(s); and priority ranking of these waters, including waters targeted for TMDL development within the next two years. These impairment decisions are compiled using a set of criteria to evaluate whether the State surface waters are attaining their designated uses, water quality criteria, and the antidegradation policy as stated in the HAR Chapter 11-54. EPA strongly encourages states to submit a single report (the Integrated Report) that satisfies

these reporting requirements of CWA sections 303(d), 305(b) and 314. (See Table 1). The State of Hawaii uses an integrated report to satisfy these requirements. The most recent integrated report 2006 State of Hawaii Water Quality Monitoring and Assessment Report: Integrated Report to Congress Pursuant to Sections 303(d) and 305(b) Clean Water Act (P.L. 97-117) is available online at <http://hawaii.gov/health/environmental/env-planning/wqm/wqm.html/>

**Table 1 Clean Water Act Requirements and Authority**

Authority	Requirement
Section 303(c)(2)	Adopt WQS including designated uses, narrative and numeric criteria and antidegradation policies
Section 106(e)	Implement monitoring programs, report on attainment of WQS, identify and prioritize waters not attaining standards.
Section 101(a)(2)	Provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable
Section 303(c)(2)(A)	Requires WQS to protect the public health and welfare, enhance the quality of water, and serve the purposes of the Act.
Sections 101(a); 303(c)(2)(A); 40 CFR 131	Provide at a minimum for the “fishable/swimmable” uses unless those uses have been shown to be unattainable
Section 303(d); 40 CFR 130.7	<p>By April 1 of all even numbered years states must submit to EPA:</p> <ul style="list-style-type: none"> <li>• A list of water quality-limited (impaired and threatened) waters still requiring TMDLs; identification of the impairing pollutant(s); and priority ranking for TMDL development, including waters targeted for TMDL development within the next two years</li> <li>• A description of the methodology used to develop the list.</li> <li>• A description of the data and information used to identify waters, including a description of the existing and readily available data and information used.</li> <li>• A rationale for any decision to not use any existing and readily available data and information.</li> <li>• Any other reasonable information requested by EPA, such as demonstrating good cause for not including a water or waters on the list CWA section 305(b);</li> </ul>
Section 305(b); 40 CFR 130.8	<p>By April 1 of all even numbered years, states must submit to EPA the following information:</p> <ul style="list-style-type: none"> <li>• A description of the water quality of all waters of the state (including, rivers/stream, lakes, estuaries/oceans and wetlands) and the extent to which the quality of waters provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water.</li> <li>• A description of the nature and extent of ground water pollution and recommendations of state plans or programs needed to maintain or improve ground water quality (optional reporting).</li> <li>• An estimate of the extent to which CWA control programs have improved water quality or will improve water quality, and recommendations for future actions necessary and identifications of waters needing action.</li> <li>• An estimate of the environmental, economic and social costs and benefits needed to achieve the objectives of the CWA and an estimate of the date of such achievement.</li> <li>• A description of the nature and extent of nonpoint source pollution and recommendations of programs needed to control each category of nonpoint sources, including an estimate of implementation costs.</li> <li>• An assessment of the water quality of all publicly owned lakes, including the status and trends of such water quality as specified in section 314(a)(1) of the CWA.</li> </ul>
Section 314	In each section 305(b) submittal, an assessment of status and trends of significant publicly owned lakes including extent of point source and nonpoint source impacts due to toxics, conventional pollutants, and acidification is required.

### **Comment 5. Applicable State Water Quality Standards**

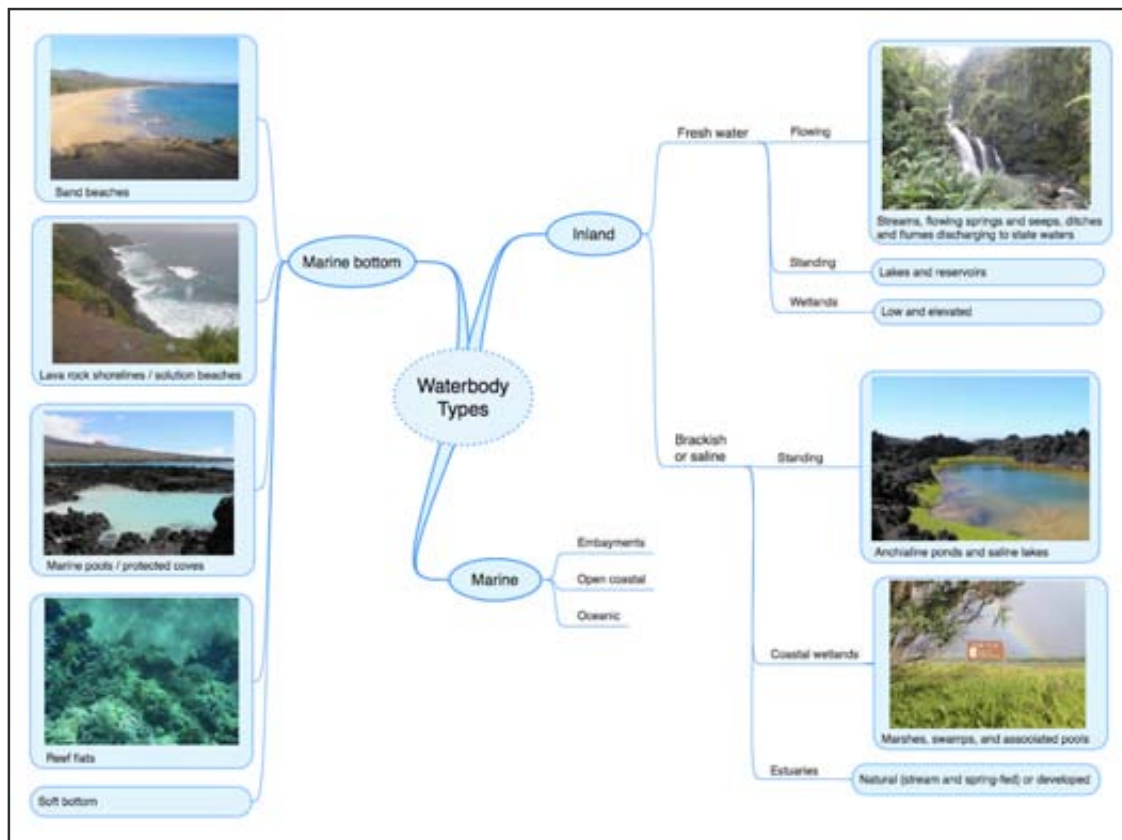
Neither EPA nor the State of Hawaii has established water quality standards that are directly applicable to groundwater. However at the Lahaina WWRF, the shallow groundwaters into which the wastes are injected are hydrologically connected to coastal waters where state and federal surface water quality standards are applicable. These surface water quality standards, while not directly applicable to groundwater, should be applied in the development of the subject permit to include water quality-based effluent limits in order to support water quality standards attainment and legally protected beneficial uses in the coastal waters that are the ultimate receptors of the effluent.

Water quality standards consist of designated beneficial uses, criteria to support attainment of uses, and an anti-degradation policy. The anti-degradation policy specifies that existing uses shall be protected and maintained. Where the quality of water exceeds that required to support propagation of fish, shellfish, and wildlife and support recreation in and on the water, the policy requires that high quality to be maintained unless allowing lower water quality is necessary to accommodate important economic or social development. Where high quality waters constitute an outstanding natural resource (e.g. state or national parks, or waters of exceptional recreational or ecological significance), that water quality must be maintained.

#### **Waterbody Types and Classes**

All waters within the state of Hawaii are classified as inland, marine, or marine bottom ecosystems. (HAR§ 11-54-2) These ecosystem types are further categorized into waterbody types as shown in Figure 6.

#### **Figure 6– Waterbody Types**



The ecosystems most likely to be impacted by the Lahaina WRF include the open coastal waters in the near shore and the associated marine bottom ecosystems (including coral reef flats) that receive submarine discharges of groundwater containing sewage constituents.

HAR §11-54-3(c) classifies water uses first by waterbody types, then by a tiered system, defining two classes of marine waters (Class AA and Class A). Open coastal waters are also classified according to types of marine bottoms. Two classes of marine bottom ecosystems (Class I and Class II) are defined.

The open coastal waters that receive submarine groundwater discharges in the vicinity of the Lahaina WWRf are classified as “AA”. (2006 State of Hawaii Water Quality Monitoring and Assessment Report. Chapter 1, Figure 4, page 22). Pursuant to §11-54-7, marine bottom ecosystems in these areas are classified as Class I due to the inclusion of these waters in a marine sanctuary (in this case the Hawaiian Islands Humpback Whale National Marine Sanctuary)

### Waterbody Objectives and Designated Beneficial Uses

HAR §11-54-3(c) (1) states “It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable,

the wilderness character of these areas shall be protected.” Zones of mixing (areas of effluent and ambient water mixing) are not permitted in certain areas of Class AA waters including:

- Within a defined reef area, in waters of a depth less than 18 meters (ten fathoms); or
- In waters up to a distance of 300 meters (one thousand feet) off shore if there is no defined reef area and if the depth is greater than 18 meters (ten fathoms).

The uses to be protected in Class AA waters are:

- oceanographic research,
- the support and propagation of shellfish and other marine life,
- conservation of coral reefs;
- wilderness areas,
- compatible recreation, and
- aesthetic enjoyment.

The classification of any water area as Class AA shall not preclude other uses of the waters compatible with these uses, objectives and in conformance with the criteria applicable to them.

It is the objective of class I marine bottom ecosystems that they remain as nearly as possible in their natural pristine state with an absolute minimum of pollution from any human-induced source. Uses of marine bottom ecosystems in this class are passive human uses without intervention or alteration, allowing the perpetuation and preservation of the marine bottom in a most natural state, such as for nonconsumptive scientific research (demonstration, observation or monitoring only), nonconsumptive education, aesthetic enjoyment, passive activities, and preservation.

#### Basic Criteria applicable to all waters

There are basic narrative criteria that apply to all waters (HAR §11-54-4). These criteria include:

(a) All waters shall be free of substances attributable to domestic, industrial, or other controllable sources of pollutants, including (emphasis added):

- (1) Materials that will settle to form **objectionable sludge or bottom deposits**;
- (2) Floating debris, oil, grease, scum, or **other floating materials**;
- (3) Substances in amounts sufficient to produce taste in the water or detectable off-flavor in the flesh of fish, or **in amounts sufficient to produce objectionable color, turbidity or other conditions in the receiving waters**; (4) High or low temperatures; biocides; pathogenic **organisms**; **toxic, radioactive, corrosive, or other deleterious substances** at levels or in combinations sufficient to be **toxic or harmful to human**,

**animal, plant, or aquatic life**, or in amounts sufficient to **interfere with any beneficial use** of the water;

**(5) Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life;**

The narrative criteria for toxic substances is implemented by the requirement that all waters be free from pollutants in concentrations which exceeding acute and chronic toxicity and human health standards. There are also provisions translating the narrative criteria in terms of toxicity testing (aquatic bioassay) results.

#### Specific Criteria Applicable to Waters Receiving Lahaina WWRF Effluent

For open coastal waters and marine bottom ecosystems receiving discharges from the Lahaina WWRF there are specific narrative and numeric criteria. "Open coastal waters" means marine waters bounded by the 183 meter or 600 foot (100 fathom) depth contour and the shoreline, excluding bays named

Numeric criteria for open coastal waters at HAR §11-54-6 include concentrations for nutrients and turbidity, expressed as wet and dry criteria and as values not to be exceeded by the geometric mean, more than ten percent of the time, and more than two percent of the time.

<b>Table 2</b>						
<b>Specific Marine Criteria</b>						
<b>Hawaii State Water Quality Standards</b>						
<b>GEOMEAN (Not-to exceed)</b>			<b>Not to Exceed &gt; 10% of time</b>		<b>Not to Exceed &gt; 2% of time</b>	
<b>Pollutants</b>	<b>Wet</b>	<b>dry</b>	<b>wet</b>	<b>dry</b>	<b>wet</b>	<b>dry</b>
Ammonia (as N) (µg/L)	3.50	2.00	8.50	5.00	15.00	9.00
Nitrate+Nitrite (as N) (µg/L)	5.00	3.50	14.00	10.00	25.00	20.00
Nitrogen, Total (ug/L)	150.00	110.00	250.00	180.00	350.00	250.00
Phosphorus (as P), Total (7723-14-0) (µg/L)	20.00	16.00	40.00	30.00	60.00	45.00
Turbidity (NTU)	0.50	0.20	1.25	0.50	2.00	1.00

NOTE: Total Nitrogen is the sum of TKN and Nitrate + Nitrite

Numerical criteria are provided at §11-54-8 for enterococcus bacteria for waters classified for recreational use. In marine recreational waters: (1) Within 300 meters (one thousand feet) of the shoreline, including natural public bathing or wading areas, enterococcus content shall not

exceed a geometric mean of seven per one hundred milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of 100 CFU per 100 milliliters or the site-specific one-sided 75 per cent confidence limit. Marine recreational waters along sections of coastline where enterococcus content does not exceed the standard, as shown by the geometric mean test described above, shall not be lowered in quality. (2) At locations where sampling is less frequent than five samples per twenty-five to thirty days, no single sample shall exceed the single sample maximum nor shall the geometric mean of these samples taken during the thirty-day period exceed 7 CFU per 100 milliliters. (3) Raw or inadequately treated sewage, sewage for which the degree of treatment is unknown, or other pollutants of public health significance, as determined by the director of health, shall not be present in natural public swimming, bathing or wading areas.

Specific criteria at §11-54-7 to be applied to “all reef flats and reef communities” include that “No action shall be undertaken which would substantially risk damage, impairment, or alteration of the biological characteristics of the areas named herein.”

**Comment 5 Lahaina WWRF receiving waters are not meeting state water quality standards.**

The Hawaii Department of Health has reported to EPA in the *2006 State of Hawaii Water Quality Monitoring and Assessment report: Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress Pursuant to Sections §303(D) and §305(B), Clean Water Act (P.L. 97-117)* that water quality in several coastal segments in the vicinity of the treatment plant, injection wells, and injectate plume are not meeting state water quality standards. The impairments listed include not meeting standards for Total Nitrogen (Honokowai Point to Kaanapali), Total P and turbidity (Honokowai Beach Park), and turbidity at Kahekili Park.

““The shallow reefs of south Maui have been experiencing large-scale blooms of the invasive red alga *Hypnea musciformis* and the native green alga *Ulva fasciata* for over a decade. . . . Our results suggest that nutrient subsidies are fueling this bloom and if nutrient inputs were reduced algal production would decrease.” C.M. Smith, “The Algal Blooms on South Maui: Do Nutrients Matter?” (abstract 2006) – USGS-National Park Service-NOAA, Ocean Science Meeting, Environmental Change and Its Impact on Coral Reefs IV. -- [http://www.agu.org/meetings/os06/os06-sessions/os06\\_OS54J.html](http://www.agu.org/meetings/os06/os06-sessions/os06_OS54J.html)

“Recent research by UH scientists which has focused on shallow Kihei reefs which are currently overgrown by *Hypnea* and *Ulva*, strongly suggests that terrestrial, likely anthropogenic, nutrients are driving algal blooms there: Concentrations of nutrients (Nitrogen and Phosphorus) are highly elevated in nearshore areas where algal blooms are found. Stable isotope ratios ( $\delta^{15}\text{N}$  ‰) in algal tissue are indicative of animal waste (presumably sewage) being their primary source.” Hawaii Department of Aquatic Resources, State of Maui’s Reefs (2008), p. 2. -- <http://hawaii.gov/dlnr/dar/pubs/MauiReefDeclines.pdf>

A significant and growing concern is the increasing overgrowth of reefs by invasive seaweeds, particularly *Acanthophora spicifera*, *Hypnea musciformis* and *Ulva* spp. Shallow reefs in Kihei and Maalaea are now almost totally overgrown by those species and *A. spicifera* has

become much more abundant in recent years at other locations including Honokowai/Kahekili and Papaula Point. Algal blooms are indicative of a loss of balance between factors which promote algal growth (e.g. nutrient availability) and those which control algal abundance (e.g. grazing). It is likely that both high nutrients & low grazing have been important” Hawaii Dept. of Aquatic Resources, Status of Maui’s Coral Reefs, 2008 --  
<http://hawaii.gov/dlnr/dar/pubs/MauiReefDeclines.pdf>

**Comment 6 - The Lahaina WWRF effluent concentrations represent reasonable potential to cause or contribute to exceedances of applicable state water quality standards.**

The application did not provide a concise summary of effluent (injectate) quality. However a cursory review of the data shows that the effluent concentrations are well in excess of the numerical state surface water quality criteria applicable to open coastal waters. The analysis is Table 2 looks at just one quarter of monitoring results from Exhibit P-4 of the application.

<b>Table 2</b> <b>Specific Marine Criteria</b>										
Application Data 4 <sup>th</sup> Qtr 2003					Hawaii State Water Quality Standards					
					GEOMEAN (Not-to exceed)		Not to Exceed > 10% of time		Not to Exceed > 2% of time	
Pollutants	min	max	AVG	geomean	wet	dry	wet	dry	wet	dry
Ammonia (as N) (µg/L)	40	249		?	3.50	2.00	8.50	5.00	15.00	9.00
Nitrate+Nitrite (as N) (µg/L)	213	564		?	5.00	3.50	14.00	10.00	25.00	20.00
Nitrogen, Total	505	781		?	150.00	110.00	250.00	180.00	350.00	250.00

It can be seen that even the minimum effluent concentration values reported exceed the highest water quality criteria concentration. The effluent pollutant concentration is higher than water quality criteria concentrations, therefore the effluent represents a reasonable potential to cause or contribute to water quality standards violations. Further evidence of this reasonable potential is shown by examination of the basic criteria applicable to all waters which include:

**“Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life;”**

Unpublished work by Meaghan Dailer and Dr. Celia Smith (University of Hawaii, Botany Department) has documented the presence of nitrogen with a stable isotope signature indicative of sewage in the open coastal waters receiving injection well effluents. These areas are also noted to have invasive algae blooms and declining coral cover. (personal communication Meaghan Dailer to Robin Knox 11/05/08). Observations of the physiological response of macroalgae to wastewater additions from the Lahaina Treatment Plant have

shown that algal blooms are fueled by nitrogen and other nutrients contained in the sewage effluent.

- “ However, natural stable isotopes of nitrogen ( $^{15}\text{N}$ : $^{14}\text{N}$ , expressed as  $\delta^{15}\text{N}$ ) have been used to detect anthropogenic nitrogen loading because different nitrogen sources have  $\delta^{15}\text{N}$  signatures (Umezawa et al. 2002, Lin et al. 2007, Gartner et al. 2002). For example, sewage derived wastewater  $\delta^{15}\text{N}$  signatures range from 11 to 25‰, and can be as high as 38‰ (Savage and Elmgren 2004). The  $\delta^{15}\text{N}$  values of macroalgae growing directly in front of sewage outfalls are often highly enriched with values ranging from 9 to 15‰ (Lin et al. 2007, Gartner et al. 2002, and Costanzo et al. 2001). Because macroalgae continuously utilize new nitrogen from their environment their  $\delta^{15}\text{N}$  values are an integration of all nitrogen sources available to them. It has been suggested that since these sources are integrated over time, the  $\delta^{15}\text{N}$  values of macroalgae are more useful in detecting anthropogenic sources of enrichment than monitoring nitrogen levels in the water column (Umezawa et al. 2002, Gartner et al. 2002). “
- “This survey shows that average macroalgal  $\delta^{15}\text{N}$  values generally reflect the areas exposure to anthropogenic impact. The  $\delta^{15}\text{N}$  value of samples from Olowalu, an area of low anthropogenic impact, was  $2.35 \pm 0.05$  ‰. The  $\delta^{15}\text{N}$  values of samples from La Perouse and Haleakala National Park, also areas of very low anthropogenic impact, were  $2.03 \pm 0.22$  ‰ and  $1.28 \pm 0.11$  ‰ respectively. To the north of the Lahaina Wastewater Treatment Plant (LWTP), the  $\delta^{15}\text{N}$  values decreased moving north from  $6.77 \pm 0.10$  ‰ to  $5.63 \pm 0.17$  ‰. In marked contrast to those low values north of LWTP, the  $\delta^{15}\text{N}$  values of samples collected from the north end of Kahekili Beach Park, slightly south of the Lahaina Wastewater Treatment Plant decreased from  $43.26 \pm 0.24$  ‰ to  $34.66 \pm 0.13$  ‰ moving to the south away from the LWTP. The values to the south of the treatment plant markedly exceed those reported for other sewage affected areas elsewhere in the world. The highest  $\delta^{15}\text{N}$  values in the literature thus far are approximately 38 ‰ for secondarily-treated sewage and  $25.7\text{‰} \pm 3.8$  ‰ for macroalgae in an estuary due to anthropogenic nitrogen loading from the Scheldt River (Savage and Elmgren 2004 and Riera et al. 2000, respectively). The values near the Kihei and Kahului Wastewater Treatment plants were  $17.6 \pm 0.01$  and  $22.2 \pm 2.92$ , respectively.

#### **Comment 7 -A NPDES permit is required in addition to a UIC permit**

The Clean Water Act prohibits discharge of pollutant to Water of the US except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES program requires permits for the discharge of “**pollutants**” from any “**point source**” into “**waters of the United States.**” The terms “pollutant”, “point source” and “waters of the US are found at 40 CFR Part 122.2

**Point source** means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff. (See §122.3).

**Pollutant** means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Waters of the US was previously defined and applicability discussed in Comment 3 of this document. The open coastal waters and marine bottom ecosystems in the proximity of the injection wells and injectate plume are “Waters of the US”.

The injection wells meet the definition of a point source. The permit application shows the presence of pollutants in the effluent (injectate) including nitrogen, biochemical oxygen demand, total residual chlorine, Total suspended solids, turbidity, total dissolved solids, fecal coliform, oil and grease, Ortho phosphate, Total Phosphorus, nitrate-nitrogen, and toxic substances. The shallow groundwaters into which the wastes are injected are connected to surface water, therefore the discharge of pollutants from a point source to waters of the US is occurring and requires regulation under the NPDES program.

The requirement to limit discharges to support attainment of state water quality standards applies whether or not an NPDES permit is required. Hawaii Revised Statutes, Subsection 342D-50(a) requires that [n]o person, including any public body, shall discharge any water pollutants into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director.

**Comment 8 -Water quality-based permit limits are necessary where a reasonable potential to cause or contribute to an exceedance of water quality standards exists.**

**40 CFR § 122.44(d)** provides that *Water quality standards and State requirements*: any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards under sections 301, 304, 306, 307, 318 and 405 of CWA necessary to:

(1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality.

(i) Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or

contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.

(ii) When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.

**Comment 9 - The pollutant load (lbs/day) from the treatment plant should comply with allocations in the Total Maximum Daily Load (TMDL) for coastal waters in the vicinity of the treatment plant. The pollutant load (lbs/day) from the treatment plant should not exceed levels allocated in the Total Maximum Daily Load (TMDL) calculations for coastal waters in the vicinity of the treatment plant.** The Hawaii Department of Health has reported to EPA in the 2006 State of Hawaii Water Quality Monitoring and Assessment report: Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress Pursuant to Sections §303(D) and §305(B), Clean Water Act (P.L. 97-117) that water quality in several coastal segments in the vicinity of the treatment plant, injection wells, and injectate plume are not meeting state water quality standards. The impairments listed include not meeting standards for Total Nitrogen (Honokowai Point to Kaanapali), Total P and turbidity (Honokowai Beach Park), and turbidity at Kahekili Park. TMDLs are currently required for these segments and are listed as a medium priority in the state TMDL program. The UIC permit and/or NPDES permit should include reopener clauses to include these allocations and water quality-based limitations when the TMDLs are completed EPA should raise the priority of the TMDLs for these segments and provide adequate funding for TMDL studies.

**Comment 10 - The permit does not adequately protect underground sources of drinking water.** The UIC program is designed to protect underground sources of drinking water. *The definition of Underground source of drinking water (USDW) includes “ an aquifer or its portion ...which contains a sufficient quantity of ground water to supply a public water system; and currently supplies drinking water for human consumption...”* (40 CFR Part 144.3). The applicant, County of Maui, recently approved a project at Starwood Lot # 3 that will use coastal groundwater as a drinking water source to be treated with reverse osmosis. The Starwood project has identified an underground source of water supply within the general proximity of the sewage injection wells. Comparison of maps provided to the County of Maui Planning Commission by Starwood (Attachment 1) to the map provided to EPA by County of Maui (Exhibit B-1 of the December 1, 2004 UIC Permit Application) indicate that this underground source of drinking water maybe within the area of review required by the UIC regulations. The applicant, County of Maui did not identify these drinking water wells in Attachment C, other wells in the general proximity.

It is requested that EPA require County of Maui to update the permit application to include location and depth of any currently approved projects or proposed drinking water supply wells using underground sources of drinking water that are within the area of review or in the general proximity of the sewage treatment plant. EPA should consider the locations of such wells or proposed wells either within the area of review or the general proximity and determine the need for monitoring wells or corrective action plans. It is requested that EPA consider the effects of drinking water and cooling water well pumping in the general proximity on the fate and transport of sewage effluent in the groundwater that is being used as a source of drinking water supply.

**Comment 11 -The permitte has not complied with Coastal Zone Management (CZM) Act enforceable policy to protect aquatic life, wildlife and recreational uses.** Underground Injection Control permits are issued under the authority of the Safe Drinking Water Act. The UIC regulations at 40 CFR Part 144.4 states, “ *The Coastal Zone Management Act*, 16 U.S.C. 1451 *et seq.* Section 307(c) of the Act and implementing regulations (15 CFR part 930) prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the State CZM program, and the State or its designated agency concurs with the certification (or the Secretary of Commerce overrides the States nonconcurrence). Applicant failed to show that the required certifications and concurrence were obtained. A letter to EPA from the state CZM program (August 18, 2008) stated that the UIC permit did not require consistency review because it is not on the list of permits requiring review. This letter did not provide certification or concurrence that the permit complies with the CZM. Federal license or permit activities and federal financial assistance activities that have reasonably foreseeable coastal effects must be fully consistent with the enforceable policies of state coastal management programs. (Federal license or permit activities are activities proposed by a non-federal applicant requiring federal authorization, and federal financial assistance activities are proposed by state agencies or local governments applying for federal funds for activities with coastal effects.)

Actual enforcement of the CZM Hawaii enforceable policies is the responsibility of the respective administering State and County agencies. (from Evaluation Findings for the Hawaii Coastal Zone Management Program From November 2001 through August 2004 (November 2005). In this case, the applicant, County of Maui is also the county agency responsible for CZM policy enforcement.

According to the website of the Hawaii CZM PROGRAM (<http://coastalmanagement.noaa.gov/consistency/welcome.html>), Federal Consistency Assessment Form, enforceable policies include:

- Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;
- Promote water quantity and quality planning and management practices, which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses, which violate State, water quality standards.

**Comment 12 – The Statement of Basis does not provide a rationale for the permit limits.**

The limits proposed represent lower quality effluent than that actually produced. Flow limits are higher than actual discharges. Resultant mass of pollutant discharge allowed is much greater than permittee reports discharging. Water quality is impaired and state water quality standards are being violated by current pollutant loads. There is no justification provided for allowing pollutant discharge mass to be so much greater than actual plant performance. Provide rationale for technology-based limits. Provide evaluation of whether there is reasonable potential for the permitted discharge to cause or contribute to exceedance of state water quality standards. Provide water quality-based effluent limits if there is such reasonable potential for standards violations.

**Comment 13 – The applicant has provided insufficient information in the application**

Require a demonstration that the discharge can be allowed in compliance with Safe Drinking Water Act, Clean Water Act and Coastal Zone Management Act. The current information is not sufficient for the permitting authority to make an assessment which considers the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water.

Require data for a reasonable potential analysis, screening effluent concentrations against state water quality criteria, including those for toxic substances;

Data for toxic substances shall be analyzed using methods capable of detecting pollutant concentrations at water quality criteria levels. Current application data uses methods with detection limits above water quality criteria levels. Many toxic chemicals reported as not detected may actually be present at levels of concern.

Require a geologic cross section showing the location of the injectate plume

Require summary of at least 12 months of effluent data not more than two years old to adequately characterize effluent. Provide minimum, maximum and geometric mean of effluent constituent concentrations.

**Comment 14 - Specific Permit conditions requested**

Effluent limits at least as stringent as those in the state injection well permit issued by the Department of Health, reflecting at a minimum secondary treatment standards of 30 mg/L average and 45 mg/L daily maximum for Biochemical oxygen demand (BOD) and Total Suspended Solids (TSS).

Include mass and concentration limits for BOD, TSS, and Total Nitrogen (TN)

Limit injectate flow to levels more representative of actual treatment capacity and discharge level as reported by the permittee. i.e 11 MGD daily maximum; 5 MGD daily average.

Limiting Daily maximum injection rate to 11 MGD reduces the permitted nitrogen load significantly from an estimated 1501 lbs/day (assuming 10 mg/L at 18 Million gallons/day (MGD)) to 917 lbs/day (assuming 10 mg/L at 11 MGD)

Effluent quality – Require an action level of 7 mg/L TN, and daily maximum effluent limit of 10 mg/ L TN.

Monitoring frequency of three times per week for BOD, TSS and Total Nitrogen (TN).

Increased monitoring frequency to 1/day for TN when action level is exceeded.

Daily effluent monitoring for fecal coliform and recreational bacterial criteria.

Effluent limit for bacteria that does not exceed state water quality criteria for recreational waters.

Require effluent toxicity testing (aquatic bioassays).

Require monitoring wells to determine effect of injectate on groundwater quality. Wells should be located to define the injectate plume and provide information on the fate and transport of effluent constituents in the environment.

Include reopener clause to allow incorporation of allocations resulting from TMDL

Require permittee to conduct a microbial characterization of effluent to include identification of pathogens, indicator organisms, and antibiotic resistant organisms. Study should include a demonstration that effluent does not contain levels of microorganisms that are harmful to human health. This characterization should be done for effluents for any method of disposal considered (injection or reuse).

Require monitoring of the receiving waters to determine environmental and ecological impacts of injectate. This monitoring program shall be developed in cooperation with the DOH, DLNR-DAR, and be subject to public review and comment. Data should be acceptable for use in the state 305(b) and 303(d) Integrated Water Quality Reporting

All effluent and receiving water monitoring data shall be made available online to the public.

#### **Comment 15 - Emerging issues of concern**

Substances such as pharmaceutical drugs, cleaning products, and antibiotic resistant pathogens have been identified nationally as emerging issues of concern for wastewater disposal. These substances may also be causing harm to fragile coastal ecosystems. EPA's permitting and water quality management efforts should recognize and address these emerging issues as well. These potential environmental impacts should be evaluated for injection, reuse or other means of disposal.

## **Conclusions**

- Groundwater and coastal ocean waters are hydrologically connected.
- Material from injection wells can be transported to coastal waters via the hydrologic connection of groundwater to ocean.
- Both the ocean water and groundwater are “Waters of the U.S.” and “State Waters”. Clean Water Act requirements are applicable to Waters of the US.
- State water quality standards are applicable to Waters of the US and State waters including the open coastal waters and marine bottom ecosystems receiving discharges from the Lahaina WWRF.
- These waters are not meeting state water quality standards.
- The Lahaina WWRF effluent concentrations represent reasonable potential to cause or contribute to exceedances of applicable state water quality standards.
- A NPDES permit is required in addition to a UIC permit.
- Water quality-based permit limits are necessary where a reasonable potential to cause or contribute to an exceedance of water quality standards exists.
- The pollutant load (lbs /day) from the treatment plant should comply with allocations in the Total Maximum Daily Load (TMDL) for coastal waters in the vicinity of the treatment plant.
- The permit does not adequately protect underground sources of drinking water.
- The permitte has not complied with Coastal Zone Management (CZM) Act enforceable policyto protect aquatic life, wildlife and recreational uses.
- The Statement of Basis does not provide a rationale for the permit limits.
- The applicant has provided insufficient infomation in the application to assess environmental impacts.
- The permit should include conditions specifically to address existing water quality concerns and emerging issues of concern.

In closing, I respectfully ask that the County of Maui and EPA act responsibly in this matter to fully disclose the nature of the effluent and to fully assess the real and potential impacts of the permitted wasteload. The permit should include limits that support attainment of state water quality standards, and protect the designated beneficial uses of state waters and waters of the US.

**Sincerely,**

**Robin S. Knox, President**

**Water Quality Consulting, Inc.**

**728A Kupulau Dr.**

**Kihei, HI 96753**

**Exhibit 1**

**Starwood Lot 3 Location of proposed project to include  
Cooling and Drinking Water Wells in Vicinity of County of Maui WWRF Injection  
Wells**

